

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES
DEPARTMENT OF INDUSTRIAL RELATIONS/CAL/OSHA**HESIS**2151 Berkeley Way
Berkeley, California 94704
Call Collect (415) 540-3014**HAZARD ALERT # 2****HAZARD EVALUATION SYSTEM AND INFORMATION SERVICE****Glycol Ethers
(Cellosolve* Solvents)**

Two glycol ethers, commonly called Cellosolves*, are now known to harm the reproductive systems of male and female test animals. They caused birth defects and damage to the male animals' testes at levels near the legal exposure limits for workers. It is not known whether these effects occur in humans.

The two chemicals are widely used industrial solvents which have until recently been treated as relatively safe. Because of their reproductive toxic effects, HESIS has recommended that the legal exposure limits be lowered, and Cal/OSHA has recommended to its Advisory Committee that the limits be lowered. A well-designed workplace and careful work practices can greatly reduce your exposure to these solvents.

MANY PRODUCTS CONTAIN GLYCOL ETHERS

Glycol ethers are a family of several solvents. They are each used alone and as ingredients in cleaning and thinning agents, and in coatings such as epoxies, wood stains, varnishes, paints and inks. Two glycol ethers are the subject of this Alert:

Ethoxyethanol (EE)

Trade Names

Cellosolve®
Dowanol EE®
Polysolve EE®
Oxitol®

Chemical Names

2-Ethoxyethanol
Ethylene Glycol Monoethyl EtherMethoxyethanol (ME)

Trade Names

Methyl Cellosolve®
Dowanol EM®
Polysolve EM®
Methyl Oxitol®
Jeffersol EM®
Ektasolve®

Chemical Names

2-Methoxyethanol
Ethylene Glycol Monomethyl Ether

A glycol ether may be in a product but not listed on the label. To find out if you're working with a glycol ether, ask your supervisor or the manufacturer for a Material Safety Data Sheet (MSDS) for each of the products you're

*Cellosolve® is the trade name for one glycol ether (ethoxyethanol) but is commonly used for the whole family of chemicals. This Hazard Alert applies only to the two glycol ethers listed above and their acetate derivatives.

concerned about. An MSDS is prepared by the manufacturer. It lists a product's ingredients and other important information such as fire and explosion information, reactivity information, spill and emergency procedures, special precautions, and health hazards. If you need help in learning whether a product you're using contains a glycol ether, call HESIS collect at (415) 540-3014.

HOW GLYCOL ETHERS ENTER AND AFFECT THE BODY

Glycol ethers can enter your body when you breathe their vapors or get the liquid on your skin. Skin exposure is particularly important because these solvents are easily absorbed through the skin. Skin contact can be avoided by taking the proper precautions and following the safe work practices described on page 3.

REPRODUCTIVE SYSTEM

Birth Defects: EE and ME caused serious birth defects in the offspring of test animals exposed during pregnancy.

Testicular Damage: EE and ME injured the testes and sperm of exposed test animals, damage that can result in infertility.

The birth defects and testicular damage occurred at levels near the permissible exposure level for workers. The animals showed no other evidence of harm that might give a warning of overexposure. There is no information on whether or not these chemicals effect the human reproductive system.

A third glycol ether, butoxyethanol (ethylene glycol monobutyl ether, Butyl Cellosolve), did not cause these effects in male test animals and has not been tested in female animals.

CANCER

Glycol ethers have not been tested for their ability to cause cancer.

OTHER HEALTH EFFECTS

All liquid glycol ethers can be mildly irritating to the skin and eyes. The vapors can irritate the eyes, nose and throat, causing burning or itching. But glycol ethers can penetrate the skin or be inhaled without causing irritation, so irritation is not a good warning of exposure.

Overexposure to any glycol ether can cause anemia, a low number of red blood cells. Symptoms of anemia may include tiredness, weakness, and shortness of breath, particularly during or just after exertion. Mild anemia often does not cause symptoms but can be diagnosed by having a blood test.

Overexposure to one glycol ether (methoxyethanol) has caused central nervous system (brain) effects in workers. Their symptoms included confusion, tiredness, loss of appetite, loss of weight, headache, nausea, vomiting and trembling hands. These symptoms were greatly improved when exposure was reduced or eliminated.

LEGAL EXPOSURE LIMITS

Workplace exposure standards are set by the Federal and California Occupational Safety and Health Administrations, called Fed OSHA and Cal/OSHA. The permissible exposure levels (PELs) for the glycol ethers were established before the studies on reproductive effects in animals. Major producers of the chemicals have since recommended that the levels be lowered significantly.

The Cal/OSHA PEL for EE of 100 parts per million parts of air (100 ppm) is presently under review. Some manufacturers are recommending 5 ppm as an exposure limit during production or formulation with EE. For ME the PEL of 25 ppm is also under review and manufacturers are recommending 3 ppm as a limit for these exposures. The California PELs for glycol ethers also include a "skin" notation, meaning that skin contact can be harmful and employers must provide appropriate protective clothing. These and all PELs are in Section 5155 of Title 8 of the California Administrative Code.

PROTECTION FROM OVEREXPOSURE TO GLYCOL ETHERS

SUBSTITUTION

The most effective way to control exposure is to use a less hazardous substance, if one is available.

ENGINEERING CONTROLS

When substitution is not possible, local exhaust ventilation or process enclosure are recommended to minimize vapor inhalation. This is particularly important if you are working with heated glycol ethers.

PERSONAL PROTECTION

SKIN: Since glycol ethers pass through the skin, it is important to wear clothing that prevents skin contact. Butyl rubber is the best material for gloves and aprons. Clothing that becomes wet with a glycol ether should be removed immediately, placed in a closed container, and cleaned by a person informed of the properties and hazards of the chemical. If a glycol ether gets on the skin, promptly flush with water, then wash with soap and water.

EYES: Splash-proof goggles should be provided and used where glycol ethers may contact the eye. If a glycol ether gets into the eye, flush immediately and thoroughly with large amounts of water. If any symptoms persist after washing, get medical attention.

RESPIRATORY: Respirators may be used when engineering controls are not technically feasible, when such controls are being installed, when they fail and need to be supplemented, or during some other

emergency. If respirators might be necessary, NIOSH-approved respirators appropriate for the level of exposure should be in place with a complete program including regular training, maintenance, inspection, cleaning and evaluation. Since you may not smell a glycol ether until your exposure is above the PEL, you may not have warning of breakthrough (vapors passing through the respirator) when using a chemical cartridge respirator. Therefore, only supplied-air respirators are approved.

HAZARD EVALUATION

Whenever it is reasonable to suspect that workers are exposed to levels higher than those allowed by law, employers must monitor the work environment. The level of exposure to a glycol ether may be determined by measurement of air concentrations in the worker's breathing zone. Skin exposure may be assessed by evaluation of work practices. Industrial hygiene services are available free to employers through Cal/OSHA Consultation Service. Employees may call Cal/OSHA's Division of Occupational Safety and Health for assistance in evaluating their exposure levels or to file a complaint if they suspect they are overexposed.

If you have questions about whether your exposures to glycol ethers are hazardous, you or your physician may call HESIS.

FOR FURTHER INFORMATION CONTACT THE FOLLOWING

Your supervisor, health and safety committee or union representative

HESIS (Hazard Evaluation System and Information Service)
Department of Health Services/Department of Industrial Relations
2151 Berkeley Way, Room 504, Berkeley, CA 94704
(415) 540-3014 (call collect)

Cal/OSHA Consultation Service (for employers)
See your local phone book under California, State of, Industrial Relations

Cal/OSHA Division of Occupational Safety and Health (for employees)
See your local phone book under California, State of, Industrial Relations

For a copy of the Cal/OSHA Permissible Exposure Limits
or other Cal/OSHA standards, write
Cal/OSHA Standards Board
1006 - 4th Street, 3rd Floor, Sacramento, CA 95814

This Hazard Alert addresses occupational exposures and is designed for employers and employees. It does not contain all the information required of a Material Safety Data Sheet under California law.